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Hermeneutic Phenomenology and Quantum Complementarity in the Philosophy of Science

PhD Thesis Summary
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An ambition of the presented dissertation is an interdisciplinary treatise of phenomenology and quantum theory; therefore an attempt to connect two seemingly independently forming disciplines that have been holding a leading position in philosophical and scientific thinking since the beginning of the 20th century. Specifically, I lay stress on Heidegger's hermeneutic phenomenology on one hand and on Bohr's philosophy and the frame of complementarity on the other hand.

I outlined, in ***Chapter I***, how a *monolithic* modern scientific view of the world and mathematization of nature was developed. Concurrently to this topic, I showed two formed possibilities of thinking – *meditative* thinking and *calculative* thinking that is linked to Heidegger's analyses of essence of technology qua *Gestell*. Since the appearance of Husserl and Heidegger's phenomenology, modern objectivist scientific notions and the subject-object paradigm of *calculative* thinking has been called in question. Modern thinking and its world view turned out to be insufficient and its thinking showed to be single-sided in its description of nature (especially in its description of subatomic phenomena) with the appearance of quantum theory. What was first disclosed and impugned by phenomenology, was later disclosed and impugned by quantum theory. This connection was presented mainly in ***Chapter II***, and also in ***amendment 1*** and ***2***. I entered on philosophical-historic basis of quantum theory in ***amendment 1***, and I outlined the question and mystery of the famous double-slit experiment in ***amendment 2***. In ***Chapter II***, I focused on two basic principles – the uncertainty principle and the principle of probability. Consequently, I analyzed Bohr's frame of complementarity and his unique insight into the ontological conception of complementarity.

As a response to the existing modern tradition of objectivistic or objectified thinking and its relation toward nature or towards what appears to us, Bohr suggested, and to a certain degree also enforced, the following theses: 1) a single type of objectified description of nature (such as wave description or corpuscular one) is insufficient; 2) advocacy or superiority of one scientific theory over another is insufficient; 3) explaining one scientific theory by another is insufficient. In order to be able to describe an object of our research in a more complex way and in all possible aspects of its appearance, according to Bohr, it is necessary to accept a dual valid understanding of the object's objectivity, which is at the same time preclusive and non-causal. Simultaneously, this means that not only traditional world viewing, imagination, notion of representation, and causality fails, as does any attempt whose aim is to search for hidden essences of observed objects that would be independent of us and of the experimental conditions. Bohr strived to transfer a complementary framework, quantum thinking and some results of quantum mechanics experiments to other, non-physical disciplines and thinking. Bohr's findings and experiments confirm findings of phenomenology, which emphasizes that in understanding and grasping of particular phenomena, occurrences and being are always already positional. Everyday life objects, in the same way as objects of experiments, do not appear all of a sudden or by themselves, or outside of our comprehensive faculty, or outside of the experimental setting, but always already in some situation and perspective, in historic connection and in pre-understanding. That's why *the same* can appear to us in a different manner. The question remains, whether it is still possible to speak about the notion of *the same*.

Both first chapters provide more synthetic and multifarious view of the development of modern and scientific thinking thanks to connection of phenomenological and quantum analyses of scientific problems. In ***Chapter III***, I focused on Heidegger's hermeneutic phenomenology that attempts, the same way as quantum theory, to overcome some scientific and philosophical assumptions and preconceptions (described in previous chapters) and to contribute to clarification of historical thinking. Phenomenology itself inspired other philosophers of science to apply it in fields of natural or social science. Among them belongs a quantum theoretician and philosopher, Heelan. Based

on his concept of quantum logics or complementarity and on hermeneutic philosophy, I drew up a simple application of complementarity and phenomenological hermeneutics in ***amendment 3***. As a base for my elaboration, I used a description of two incompatible, but according to Heelan, complementary approaches in perception of everyday reality: the first approach is a learned reason construction in the form of Euclid's geometry and for centuries experienced practices of measurement. The second approach is experienced practice and perception of the world.

To my knowledge, influence by the phenomenological method of philosophizing and quantum theory or Bohr's complementarity is not applied in methodology or philosophy of science or in history of science and in education; neither is it discussed or solved in this form in our country (and rarely abroad). That's why I tried to mediate the above mentioned interdisciplinary possibilities, in the manner of outlining several common bases, problems, topics, and questions that disclosed, dealt with or were addressed by Heidegger's phenomenology and quantum theory.